- claims 8-15 under 35 U.S.C. §103(a) as being unpatentable over Utsumi and Yamahara and further in view of Wada et al. (Wada).

Applicants respectfully traverse these rejections as follows.

With regard to Applicants' independent claim 1, as explained in Applicants' Amendment filed September 19, 2001 and Response filed March 19, 2002, one of the features of the embodiment of Applicants' invention as claimed in claim 1, is changing the thickness of the liquid crystal layer in each color layer in order to efficiently control coloring when viewing from an oblique direction in the IPS mode liquid crystal display element having a wide view angle. Shimizu and Oh-e do, do not teach or suggest the structure for an active matrix liquid crystal display panel as claimed in Applicants' independent claim 1, "whereby an appearance of white color is gained by applying different driving voltages to the pixel electrodes, depending upon the different thickness of the crystal layers in each of the color layers" (*Id.*).

In reply to Applicants' Response filed March 19, 2002 (which is incorporated herein by reference), the Examiner does not even attempt to show how Shimizu discloses or suggest varying the level of driving voltages applied to pixel electrodes (see Office Action, Paper No. 17, page 10, line 16 through page 11, line 1). In this regard, Applicants respectfully reiterate that Shimizu has nothing to do with the level of driving voltages applied to the pixel electrodes. Instead, Shimizu discloses various structures for a color filter, which is the object of Shimizu's patent (see, Shimizu, col. 2, lines 27-32).

With regard to Ogawa, as explained in Applicants' Response filed March 19, 2002, while Ogawa describes the general principle of transmittance being a function of the wavelength and applied voltage, and provides a structure wherein "undesired wavelength-dependency of the

transmittance is eliminated" (*Id.*, col. 7, lines 54-61 and col. 8, lines 2-7), Ogawa does not disclose or suggest an active matrix liquid crystal display panel configured for "applying different driving voltages to the pixel electrodes, depending upon the different thickness of the crystal layers in each of the color layers", as required by Applicants' claim 1.

That is, Ogawa discloses nothing more than a color liquid crystal display apparatus, modified to eliminate wavelength-dependency of the transmittance, wherein the same driving voltage is applied to all pixel electrodes irrespective of the thickness of the crystal layer (*see e.g., Id.*, col. 7, lines 10-27). The Examiner alleges that Ogawa discloses varying the level of the applied driving voltage because it discloses experimental data as a function of varying "impressed voltage" (see Office Action, Paper No. 17, page 11, lines 1-11). Applicants respectfully disagree. In fact, Ogawa does not disclose or suggest anything other conventional application of appropriate voltage above the threshold value V_{th} to electrodes 5a and 5b (see Ogawa, col. 2, lines 58-67, Fig. 4; and col. 6, lines 48-57). That is, Ogawa applies the same voltage value, via electrodes 5a and 5b (*see Id.*, Figs. 15, 16, 19-22, 27 and 28) to all three electrodes corresponding to R,G,B.

The Examiner alleges that, "Ogawa discloses the principle for the multi-gap type liquid crystal cell in which applying different driving voltage to the pixel electrodes depending upon the different thickness of liquid crystal layer in each color layer will obtain a transmittance of a full color lights (that is an appearance of white color lights)" (Office Action, page 4, lines 4-7).

However, Ogawa's Figs. 9(a) and (b) show the wavelength dependency of the transmission for a constant gap (5.7 μm) with voltage being varied (0V-4V). Therefore, Ogawa

does not teach or suggest that the driving voltage should be varied when the gaps are changed for Red, Green and Blue. Further, as disclosed in Ogawa's column 7, lines 42-61, because of the multi-gaps, the Voltage-Transmittance curve for each of the wavelengths tends to be uniform as shown in Ogawa's Fig. 11. Accordingly, when the multi-gaps are applied to Twisted Nematic mode, it is not necessary to change the voltage for R, G and B (Red, Green, and Blue) respectively.

On the other hand, as explained in the specification, when the multi-gaps are applied to Twisted Nematic mode, and especially to In Plain Switching mode, a driving voltage becomes generally larger inversely proportional to the gaps. Therefore, it is necessary to increase the driving voltage correspondingly to the gap.

Thus, contrary to the Examiner's analysis, Ogawa does not disclose and is incapable of suggesting "applying different driving voltages to the pixel electrodes, depending upon the different thickness layers in each of the color layers", as required by Applicants' claim 1.

Accordingly, Applicants' independent claim 1, as well as its dependent claim 2 (which incorporates all the novel and unobvious features of its base claim 1), would not have been obvious from any reasonable combination of Oh-e, Shimizu and Ogawa.

With regard to Applicants independent claims 3 and 5, as explained in Applicants' Response filed March 19, 2002, Utsumi does not disclose, teach or suggest at least the feature of "said pixel electrodes and said opposing electrodes being spaced from each other by distances which are different for the individual color layers" (claims 3 and 5). That is, Utsumi discloses nothing more than a conventional configuration of the electrodes in a liquid crystal display panel

wherein pixel electrodes and common electrodes are arranged at identical distances from each other (see Utsumi, col. 11, line 61 through col. 13, line 9; Figs. 21(a) and 21(b)). The Examiner takes the position the in Utsumi pixel electrodes and corresponding opposing electrodes are arranged at different distances due to varying thickness of the corresponding color filters R,G,B. However, this is contrary to Utsumi's actual disclosure. In fact, nowhere (including col. 11, lines 25-43 and Fig. 6, cited by the Examiner) does Utsumi disclose or suggest that the spacing between the pixel electrodes and opposing electrodes has any relation to the thickness of color filters corresponding to the pixel electrodes. On the contrary, in every cross-sectional view which illustrates pixel electrodes and corresponding common (opposing) electrodes, Utsumi shows pixel electrodes and common electrodes arranged at identical distances from each other (see Id., Figs, 21(a) and 21(b))[1]

Likewise, Shimizu does not disclose, teach or suggest pixel electrodes and opposing electrodes being spaced from each other by distances which are different for the individual color layers (see Shimizu, Fig. 1).

Accordingly, Applicants' independent claims 3 and 5, as well as their respective dependent claim 4 and 6 (which incorporates all the novel and unobvious features of their base claims), would not have been obvious from any reasonable combination of Utsumi and Shimizu.

[1] Applicants note that Fig. 6 cited by the Examiner does not show either the pixel electrodes or the common electrodes.

With regard to Applicants' independent claim 7, as explained in Applicants' Response filed March 19, 2002, one of the features of the embodiment of Applicants' invention as claimed therein, is:

> an optical compensation layer having a negative refractive index anisotropy in a one axis direction, a projection of the anisotropic axis of said optical compensation layer on a plane of one of said substrates being parallel to at least one of polarization axes of said two polarizing plates, said optical compensation layer being disposed at least between the one transparent insulating substrate and a corresponding one of said polarizing plates (claim 7).

The Examiner acknowledges that Utsumi does not disclose such a feature and relies on Yamahara to supply this acknowledged deficiency. In particular, Yamahara discloses a "phase difference plate negative in the refractive index anisotropy, with the principal refractive indices in the relation of nz=nc<nb" (*Id.*, col. 5, lines 29-31; see Fig. 1), arranged such that "the principal refractive index nb is inclined in the direction of arrow 20 at an angle θ around the y-axis about the normal direction of the surface (the z-axis in Fig. 1)" (*Id.*, col. 7, lines 22-25). Citing Fig. 4, the Examiner alleges that in Yamahara the axis of compensation layer (1) is parallel to the polarization axes of the polarizing plates (4) (see Office Action,. Paper No. 17, page 12, lines 1-2). However, like Fig. 1, Yamahara's Fig. 4 shows only that "the fast direction 25 which is the direction of the <u>minimum</u> principal refractive index na of the phase difference plate 1 [is] set to be parallel to [the transmission axis of polarizer 4]" (*see Id.* col. 7, lines 50-61, emphasis added).

That is, Yamahara does not disclose or suggest that its difference plate 1 has a <u>negative</u> refractive index anisotropy in any of its axis directions, and therefore is incapable of disclosing or suggesting an arrangement wherein the projection of the direction of the axis having a negative index anisotropy is parallel to the polarization axis of either of its polarizers 3 or 4.

Likewise, Wada does not disclose or suggest "an optical compensation layer having a negative refractive index anisotropy in a one axis direction, a projection of the anisotropic axis of said optical compensation layer on a plane of one of said substrates being parallel to at least one of polarization axes of said two polarizing plates", as required by Applicants' claim 7. (see Wada, col. 5, line 48 through col. 6, line 25; see also Fig. 8).

Accordingly, Applicants' independent claim 7, as well as its dependent claim 8-15 (which incorporates all the novel and unobvious features of their base claim), would not have been obvious from any reasonable combination of Utsumi, Yamahara and Wada.

In summary, none of the cited prior art references, applied alone or in any reasonable combination, teach or suggest the structural features of the optical system according to the present invention.

The present invention relates to technique for restraining light leakage when viewing from an oblique direction in the black state in Plain Switching mode, that is, on homogeneously orientated state parallel to the direction of any one of polarization axes of the polarizing plates arranged in cross nichol.

None of the prior art references teaches or suggests a technique where the black state in Plain Switching mode could be compensated with a novel arrangement as defined by Applicant's claimed invention.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

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